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Civilians Use Satellite Photos For Spying on Soviet Military

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Aerospace experts say a new era has dawned in which civilians are beginning to use satellite cameras to spy on military targets, including ships, submarines and missiles.

Technical advances in camera design and the advent of vigorous free-market competition to sell space photographs have given scholars, the news media and other civilians access to photos of military installations that had been available only to intelligence agencies of the United States and the Soviet Union, the experts say.

In the past, photos from civilian satellites were used mainly for crop forecasting, mineral exploration and forestry management. Such uses require a distant view of the earth's surface.

More Powerful Cameras

But civilian satellite cameras, although still less powerful than military spy satellites, are being built to take closer looks at small objects. This enables city planners, for instance, to locate and evaluate sites for streets, buildings and parks.

On Feb. 22, the French launched a satellite, SPOT, which offers the best resolution yet of any civil satellite. One of its first images, of Nice, on the Riviera, included sharp details of the streets and marinas. SPOT, which is cheaper than high-altitude aerial operations, can also cover a wide geographical area.

Given the latitude and longitude of a particular spot anywhere on the globe, SPOT and its American competitor, Landsat, can supply a photograph of that spot recreated from electronic signals, and SPOT can photograph a point as often as twice a week. Landsat photos cost from $80 to $500; SPOT photos cost $155 to $1,780.

Sales of Photos Pushed

A marketing push increasing the availability of the photos began last year when the American Landsat satellite, developed by the Government, was turned over to a commercial company. It is increasing the diversity of available images.

Previously, the Department of Defense inhibited sales of Landsat pictures it considered sensitive, an option it still has but is not exercising as vigorously, according to aerospace experts.

"Up until this point, the distinction between military and civilian uses has been fairly well maintained," said Rebecca Simmons, an analyst at the Center for Space Policy, a consulting firm in Cambridge, Mass. "But SPOT's new resolution and Landsat's efforts to expand its market are raising the issue of using civilian data for private reconnasiance."

"It's used to be that only the military had spy satellites," said Dr. Peter E. Glaser, a consultant to the National Aeronautics and Space Administration and vice president of Arthur D. Little, a research firm in Cambridge. "But increasingly we have the capability to achieve very high resolutions."

"With SPOT, you're able to see individual launching pads and rockets," said Charles P. Vick, an aerospace expert in Huntsville, Ala., whose detailed drawings of the Soviet Union's missile launching sites, aided by Landsat photos, have been used in scholarly reports and Congressional studies.

Aerospace experts say civilians are only starting to use such satellite images for purposes of military reconnaissance, but already there is a diverse group of users, including researchers of the British Interplanetary Society, scientists of the University of Alaska, and editors of such publications as the National Geographic and Aviation Week & Space Technology.

Such groups have used the satellite photos mainly to peek into the secretive world of the Soviet military.

A more clandestine group of users is foreign governments that cannot afford spy satellites but want to monitor military developments in other countries, according to trade journals and aerospace experts. Only the United States and the Soviet Union are known to have photographic spy satellites.

The new surveillance technology, and the promise of even more powerful civilian satellites, is raising a wide range of constitutional and national security issues, according to aerospace experts. At one constitutional extreme is personal privacy and at the other is freedom of the press, topics that are to be addressed at a hearing planned by the House Subcommittee on Space Science and Applications of the Committee on Science and Technology.

"It's going to be interesting when somebody starts taking pictures from space of people sunbathing," said David Williamson, Jr., an aerospace expert at the Center for Strategic and International Studies of Georgetown University.

Question of Terrorist Use

Some experts fear that terrorists might use satellite photos to plan attacks, an idea vendors of satellite photos disparage.

"It's not a dangerous tool but a helpful one," said Nadine Binger, manager of market development for the SPOT Image Corporration, a company in Reston, Va., that distributes SPOT photos.

Dr. Glaser agreed. "It could bring on an era of restraint," he said. Most secret military operations usually need "a cloak of darkness and fog," he said.

For most of the space age, only the United States and the Soviet Union have had the advantages and responsibilities of space surveillance. Their military satellites orbiting at altitudes of more than 100 miles are said to be able to take pictures revealing the numbers on license plates.

In 1972, civilians got their first reconnaissance-type cameras in space with the advent of the Landsat satellites, developed by the National Aeronautics and Space Administration to monitor crops, forests and other earth resources. Today the best resolution of a LANDSAT camera, from about 400 miles up, is 30 meters, meaning that from its orbit it can clearly discern objects the size of one-third of a football field.

The limits on Landsat power were set by the Defense Department, which restricted the evolution of civilian camera technology and the publication of sensitive photos.

Avoiding Some Locations

"We found that the way to stay out of trouble was not to take certain pictures," said Mr. Williamson, who before working at the Center for Strategic and International Studies was a special assistant to the NASA Administrator for national security.

Despite such restrictions, scientists found ways of monitoring military developments from space. In 1983, Dr. John M. Miller of the Geophysical Institute of the University of Alaska was able to watch Soviet military icebreakers trying to save 50 Soviet ships trapped in an unusually early ice buildup inside the Arctic Circle. The Landsat photos he used were published in the Nov. 28, 1983, issue of Aviation Week & Space Technology, a respected industry journal that has pioneered civil reconnaissance of military targets.

In 1984, more of Dr. Miller's photos were published by the magazine. They showed what was believed to be a Soviet submarine engaged in tests of whether nuclear-tipped missiles could be launched from beneath the Arctic ice pack. His pictures showed a break in the ice though which a rocket could be launched, and aircraft observing the test. The revelation prompted a wide debate in and out of Government about whether the Soviet Union was testing a new method of firing nuclear missiles.

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Soon after Dr. Miller's work was published in late 1984, at least one foreign government started to use Landsat photos for spy purposes. According to Defense Electronics, a respected industry publication, Japanese military forces in March 1985 began to use LANDSAT photos to monitor Soviet military activity in eastern Siberia and Japanese coastal waters. There has been no comment from the Japanese in response to the article.

Surveillance of rapidly moving military targets can best be done with photos taken and processed as quickly as possible, according to aerospace experts. Sometimes, it can take months to get a particular image from Landsat, but both Dr. Miller and the Japanese receive photos instantly through their own ground stations operated under arrangement with Landsat.

Even with the delays, scholars have been able to monitor some military projects. Mr. Vick, who for years has been studying Landsat photos, has become an international authority on the construction of launching sites for Soviet missiles. And the National Geographic magazine is preparing an issue on the Soviet space program that is said to show runways being built for a Soviet space shuttle.

The operation of two aging Landsat satellites was taken over last year by the Earth Observation Satellite Company, a partnership of the Hughes Aircraft Company and the RCA Corporation. Based in Lanham, Md., Eosat is struggling to speed up and diversify Landsat operations.

In deference to the Defense Department, the public law that spun off Landsat says its satellite pictures should be distributed without "preference, bias, or any other special arrangement, except on the basis of national security."

But new competition from SPOT is making the old security-conscious rules obsolete, according to aerospace experts. The French satellite's cameras are much better, having resolution down to 10 meters. From 517 miles up they can be pointed from one side of the satellite to the other, allowing it to repeatedly photograph a particular part of the earth. Landsat took two weeks to rephotograph a particular area, whereas SPOT, Systeme Probatoire d' Observation de la Terre, can do it twice a week.

"It has the capability to distinguish the movement of men and materiel, showing long-term buildups along a border," said Ray A. Williamson, an aerospace expert at the Congressional Office of Technology Assessment.

"SPOT is a big step over Landsat," said Mr. Vick. "It has the potential to revolutionize the process of Soviet studies."